

REMARKS

In response to the Office Action dated September 5, 2002, claims 1, 5-11, 13-21,
*OK to cancel
8/29/03*
26 and 27 are canceled, and claims 2, 3, 12, 22 and 23 are amended. Claims 2-4, 12 and 22-24 are now active in this application. No new matter has been added.

The indication that claims 23 and 24 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, is noted with appreciation. By this response, claim 23 is amended to be in independent form including all the limitations of base claim 1. Consequently, amended claim 23, and claim 24 depending from amended claim 23, are believed to be allowable.

CLAIM OBJECTIONS

Claims 2-11, 13 and 15-22 are objected to under 37 C.F.R. §1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

The objection is moot as to canceled claims 5-11, 13 and 15-21, and respectfully traversed as to claims 2-4 and 22.

The limitations recited in each of these claims is significant and affects the apparatus of the claims they depend from. The Examiner's criticism of the claims is urged to be directed to issues of obviousness and not proper dependency. In fact, *In re Otto*, 136 USPQ 458, cited by the Examiner, relates to issues of obviousness and not proper dependency. Applicants are not aware of, and the Examiner has not cited, any case law which prohibits limiting the subject matter of a previous claim in the manner recited in claims 2-11, 13 and 15-22.

Consequently, withdrawal of the objection to claims 2-11, 13 and 15-22 as being of improper dependent form for failing to further limit the subject matter of a previous claim is respectfully solicited as Applicants are entitled to define the subject matter of their claims in the manner recited in these claims.

Claims 10-13 are objected to because of informalities. By this response, claims 10-13 are amended to address the Examiner's objections.

REJECTION OF CLAIMS UNDER 35 U.S.C. § 102 AND § 103

Claims 1-11, 13-22 and 26 are rejected under 35 U.S.C. §102(b) as being anticipated by Cima et al. (hereinafter, Cima).

Claim 12 is rejected under 35 U.S.C. §102(a) as being unpatentable over Cima et al. (U.S. Patent No. s5,387,380) in view of Haas et al. (U.S. Patent No. 3,663,137).

Claim 27 is rejected under 35 U.S.C. §102(a) as being unpatentable over Cima et al. (U.S. Patent No. s5,387,380) in view of Japanese Patent 10-207194.

To expedite prosecution, claims 2, 3, 12 and 22 are amended to be in independent form and to emphasize subject matter not disclosed in Cima, and claims 1, 5-11, 13-21, 26 and 27 are canceled.

Anticipation, under 35 U.S.C. § 102, requires that each element of the claim in issue be found, either expressly described or under principles of inherency, in a single prior art reference. *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 USPQ 781 (Fed. Cir. 1983).

Amended claim 2 requires, *inter alia*:

said controller controls said applying head to apply one material included in said plural kinds of materials after application of another

material, with said another material becoming stable faster than said one material after applied to said layer.

Cima does not disclose or suggest the controller now recited in amended claim 2.

Thus, amended claim 2 is patentable over Cima.

Amended claim 3 requires, *inter alia*:

said controller controls said applying head to apply binder and ink.

Cima does not disclose or suggest the controller now recited in amended claim 3.

In fact, there is no disclosure or suggestion that the applying head applies anything other than binder. Thus, amended claim 3, and claim 4 depending from amended claim 3, are patentable over Cima.

Amended claim 12 requires, *inter alia*:

detectors for detecting an amount of each of said plurality of binders remaining in each said plurality of tanks, wherein
the controller controls said applying head to apply a binder which has the greatest remaining amount to said non-coloring region.

Cima does not disclose or suggest the controller now recited in amended claim 12.

In fact, Cima mentions nothing about coloring and non-coloring regions. Thus, amended claim 12 is patentable over Cima.

Amended claim 22 requires, *inter alia*:

the controller controls said applying head to apply a binder which has the greatest remaining amount to said non-coloring region.

Cima does not disclose or suggest the controller now recited in amended claim 22.

Thus, amended claim 22 is patentable over Cima.

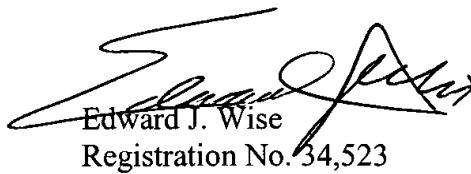
CONCLUSION

Accordingly, it is urged that the application, as now amended, is in condition for allowance, an indication of which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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VERSION WITH MARKINGS SHOWING CHANGES MADE

IN THE ABSTRACT:

Please amend the abstract as follows:

In a 3D product forming apparatus, a nozzle head includes nozzles that respectively jet binders colored in [Y, M, C,] yellow, magenta, cyan, and a nozzle that jets a binder colored in white. A powder layer can be formed on a product forming stage, and the binders are jetted onto the formed powder layer from the nozzle head. At a predetermined region in the powder layer, the powder is bound by the binders. The binders are jetted each time when a powder layer is laminated in forming a plurality of successively laminated powder layers, thereby to form a 3D product on the product forming stage. This allows the product to be colored as well in the product forming process. As a result, 3D products colored in various colors can be created in a short time and at a low cost.

IN THE CLAIMS:

Please amend claims 2, 3, 12, 22 and 23 as follows.

2. (Amended) [The apparatus of claim 1] An apparatus for forming a three-dimensional product by applying binder to powder material to form bound bodies successively, said bound bodies corresponding to sectional data blocks which are produced by slicing an original object with parallel planes, said apparatus comprising:
a layer forming mechanism for forming a layer of said powder material;

an applying head for applying plural kinds of materials to said layers, said plural kinds of materials including at least one kind of binder; and

a controller for controlling said applying head to apply said plural kinds of materials selectively to a predetermined region on said layer, wherein

said controller controls said applying head [applies] to apply one material included in said plural kinds of materials after application of another material, [and] with said another material [becomes] becoming stable faster than said one material after applied to said layer.

3. (Amended) [The apparatus of claim 1] An apparatus for forming a three-dimensional product by applying binder to powder material to form bound bodies successively, said bound bodies corresponding to sectional data blocks which are produced by slicing an original object with parallel planes, said apparatus comprising:

a layer forming mechanism for forming a layer of said powder material;

an applying head for applying plural kinds of materials to said layers, said plural kinds of materials including at lease one kind of binder; and

a controller for controlling said applying head to apply said plural kinds of materials selectively to a predetermined region on said layer, wherein

said controller controls said applying head [applies] to apply binder and ink.

12. (Amended) [The apparatus of claim 10, further] An apparatus for forming a three-dimensional product by applying binder to powder material to form bound bodies

successively, said bound bodies corresponding to sectional data blocks which are produced by slicing an original object with parallel planes, said apparatus comprising:

a layer forming mechanism for forming a layer of said powder material;

an applying head for applying plural kinds of materials to said layers, said plural kinds of materials including at least one kind of binder; and

a controller for controlling said applying head to apply said plural kinds of materials selectively to a predetermined region on said layer, wherein

said applying head applies a plurality of binders to said predetermined region, said plurality of binders having different colors from one another,

said predetermined region is include a coloring region and non-coloring region, and

said powder material is bound with said plurality of binders selectively in said coloring region and with one of said plurality of binders in said non-coloring region

said apparatus further comprising:

a plurality of tanks for containing said plurality of binders and supplying said plurality of binders to said applying head; and

detectors for detecting an amount of [rest] each of said plurality of binders remaining in each said plurality of tanks, wherein

the controller controls said applying head to apply a binder which [is] has the greatest remaining [comparatively more in one of said plurality of tank is applied] amount to said non-coloring region.

22. (Amended) An apparatus for forming a three-dimensional product by applying binder to powder material to form bound bodies successively, said bound bodies corresponding to sectional data blocks which are produced by slicing an original object with parallel planes, said apparatus comprising:

a layer forming mechanism for forming a layer of said powder material;
an applying head for applying plural kinds of materials to said layers, said plural kinds of materials including at least one kind of binder; and
a controller for controlling said applying head to apply said plural kinds of materials selectively to a predetermined region on said layer, wherein
said controller controls said applying head so that an amount of said at least one kind of binder applied to said predetermined region is constant per unit area of main surface on said layer of said powder material.

23. (Amended) [The apparatus of claim 1,] An apparatus for forming a three-dimensional product by applying binder to powder material to form bound bodies successively, said bound bodies corresponding to sectional data blocks which are produced by slicing an original object with parallel planes, said apparatus comprising:

a layer forming mechanism for forming a layer of said powder material;
an applying head for applying plural kinds of materials to said layers, said plural kinds of materials including at least one kind of binder; and
a controller for controlling said applying head to apply said plural kinds of materials selectively to a predetermined region on said layer, wherein
said layer forming mechanism comprises:

powder supplier for forming a left-side heap and a right-side heap of said powder material on left and right sides of a space where said three-dimensional product is formed; and

a left-side powder spreading member and a right-side powder spreading member provided on left and right sides of said applying head, respectively,

in case of moving said applying head from left to right, said right-side powder spreading member spreads said left-side heap to right direction to form a layer of said powder material, and

in case of moving said applying head from right to left, said left-side powder spreading member spreads said right-side heap to left direction to form a layer of said powder material.